TECHNICAL SUPPORT DOCUMENT
Air Quality Control Permit No. 1000383
for
Yarnell Mining Company

1. The Midwest Research Institute conducted a study of the effectiveness of various dust suppressants for the EPA in 1988. As a result of that study an empirical equation was developed watering to estimate the efficiency based on various parameters. The equation is:

$$C = 100 - (0.8\ p\ d\ t/L)$$

Where: C = average control efficiency (%)
p = potential average hourly daytime evaporation rate (mm/h)
d = average hourly daytime traffic (h^{-1}),
t = time between applications (h)
L = application intensity (L/m^2)

Solving for the application intensity, one has the following:

$$L = (0.8\ p\ d\ t) / (100-C).$$

RESULTS:

	Road Segments						
C (%) =	90	90	90	90	90	90	90
d =	43	36	7	7	14	2	22
t =	4	4	4	4	4	4	4
p =	0.175	0.175	0.175	0.175	0.175	0.175	0.175
L (L/m^2) =	2.41	2.02	0.39	0.39	0.79	0.11	1.23
L (gal/yd^2) =	0.53	0.45	0.09*	0.09*	0.17	0.02*	0.27
Conversion	0.22						

* Aminimun application intensity was set at 0.15 gal/yd^2

2. The $MgCl_2$ rate of 1.34 pounds per square yard is based on data presented in a Bureau of Mines report, Fugitive Dust Control for Haulage Roads and Tailing Basins (Report of Investigations 9069, 1984). $MgCl_2$ was applied at the rate of 0.5 gallons/yd^2 (32 % $MgCl_2$) and obtained greater than 90 percent control. This converts to 1.34 pounds of $MgCl_2$ per square yard.

3. Fugitive Volatile Organic Compound (VOC) Emissions are considered an insignificant activity because of smallness of the emissions. VOC emissions for the entire facility are less than 5 tons per year. However, since there is an applicable regulation (A.A.C. R18-2-730), a condition was put in to cover that applicable regulation.

4. The emissions of NO_x and SO_2 are from the combustion of propane in the Carbon Kiln and Doré Furnace. Propane is a clean fuel with negligible sulfur and ash. For NO_2 please see attached Memorandum which gives emission test results of 1-3 ppm of NO_x.

5. EPA suggested that the haul road opacity limit be set at 10 percent rather than the SIP value of 40 percent. The reason stated was that 40 percent opacity should not be even approached for a 90 percent controlled haul road.

ADEQ agrees, but Method 9 will not yield significant results. The traffic frequency is very low for some road segments, e.g., the most traveled segment has 43 trips per hour or one every 1.4 minutes and the least traveled segment has two trips per hour or one every 30 minutes. Since Method 9 requires 24 observations every 15 seconds (total six minutes), only 4.3 episodes will occur during the test. This will result in many zero readings to be factored into the average. Further, there is no quantitative correlation between opacity and mass emissions. If ambient monitoring is required, that should be adequate to assure compliance. ADEQ, therefore, would prefer using the SIP requirement of 40 percent opacity limit.

6. EPA commented that biennial testing of the discharge from the two baghouses was not sufficient. Both of these sources are very small such that there is little chance that they could cause a violation. The permit has been redrafted to include periodic visual opacity observations and inspection and maintenance of the baghouses. ADEQ believes that this is adequate.

7. ADEQ believes there are no SIP requirements applicable to the carbon stripping heater. In the modeling process it was assumed that the emissions resulted from the combustion of propane in the three 1.2 MMbtu burners. AP-42 emission factors were applied (AP-42, Section 1.5).

8. EPA asked whether the permit included all of the affected facilities in Subpart LL. After reviewing this issue with the applicant, it appears that all affected facilities have been included except truck loading station, which has now been listed.